

# INFLUENCE OF FACE-TO-FACE MEETINGS ON VIRTUAL COMMUNITY ACTIVITY: THE CASE OF LEARNING NETWORK FOR LEARNING DESIGN

Author Name

*Affiliation*

*Address*

*E-mail*

## ABSTRACT

Virtual communities main feature is the interchange of ideas and points of view around a specific topic, frequently split into several sub-topics. This activity involves participation, both active and passive, and it feeds back the community, keeping it warm and dynamic. On the other hand, thematic face-to-face meetings build and feed existing links between their members and encourage discussions on the topic of the conference. Using the virtual community of Learning Network for Learning Design – LN4LD (OUNL, 2004) and the European project UNFOLD (UNFOLD, 2004) we monitored and analysed several data of actions taken by users, members of this learning network. Both, the virtual community LN4LD and the face-to-face meetings for UNFOLD, are fully focused on the dissemination and adoption of the specification IMS Learning Design and keep a strong shared relationship chasing this common objective.

Between January and June 2005 UNFOLD organized three face-to-face meetings. After the measuring and interpretation of all the data collected along this period, we are able to demonstrate that there is a direct cause and effect relationship between the organization of face-to-face meetings and the increase of registered users and the related actions taken by them inside the virtual community. We hypothesize that virtual communities of non-structured learning get more internal activity when supplemented with face-to-face meetings. This means that the face-to-face relationships increase and make stronger virtual links and they encourage the activity in the learning network.

Along this case study we also show that it was multiplied by six the amount of actions taken by users and by four the amount of registered users. This paper provides a full detailed report on all the process and about the reading of the results that support the initial hypothesis. Supplementary, and in order to focus the topic of research and our approach, we also describe the theoretical background underneath the case study and a specific summary of the current panorama on virtual communities about IMS LD.

## KEYWORDS

Virtual community, face-to-face meeting, IMS Learning Design, learning network

## 1. INTRODUCTION. DEFINITION AND FEATURES OF A VIRTUAL COMMUNITY

We define a virtual community like any group of users built around an initial specific theme or activity and that usually keeps an asynchronous communication, but not only, and some sharing of information, opinions and resources, while using an online platform or environment. This communication can be enriched with some punctual face-to-face meetings, like congresses, conferences or training workshops. The term virtual community was first pointed out by Howard Rheingold (Rheingold, 1993) who, in his book *Virtual Community*, made an analysis and further description of the factors and features that describe a community of non-face-to-face users.

Although in 1993 the World Wide Web was not invented yet, it was born in 1996 by Tim Berners-Lee (Berners-Lee, 2001), there were so far some services and resources living in Internet, like emailing lists, online chats, peer-to-peer communications or postings. All these facilities were the core of Internet and they will be the base for later virtual communities.

We also could consider the term virtual community as a qualification or extension of another term, community of practice, first pointed out in 1991 by Jean Lave y Etienne Wenger (Lave and Wenger, 1991) with the meaning of a group of people met around a topic of common interest to share ideas and find solutions. Certainly, in the current virtual communities there is no urgent need for the second goal,

find solutions, although people want to interchange their knowledge while discussing certain topics and using facilities and resources.

Additionally, the main features of a virtual community are: a) a member of it feels himself as a part of a wider social statement, b) there is a network of relationships between its users, c) there is a continuous interchange of ideas and contents full of meaning for their users, and d) the relationships between the members of the community keep along the time, building set of interlaced stories (Figallo, 1998; Kwoch and Schwier, 1997). Also, for Hagel and Armstrong (1997) there is a set of drives to create and feed the community, like a) a common objective or interest together with other people, b) the willing to share a personal experience or background or to establish social relationships, c) the willing of enjoying some rewarding new experiences or of living a fantasy, and d) the need of making any kind of transaction.

It's true that Internet is not needed at all to build and create virtual communities. For instance, we can take the well-known case of the scientist Robert Boyle, in XVII century, who built something called the invisible colleges (Spratt, 2003). This group of people was formed by several prominent scientist around England and old Europe and share common goals to increase and spread the benefits of the Science, looking for answers to questions that Religion couldn't provide. Later, in 1660, this group founded a legal association that would become the Royal British Society, usually considered as the oldest scientific society in the World. In these invisible colleges their members devoted to Science as a new philosophy and established contacts and relationships, using mail and periodical face-to-face clandestine meetings. They used these meetings to discuss theoretical and practical hot topics on Science and to make the links between them stronger. Nowadays, these invisible colleges could be the existing virtual communities of private contacts between members of research groups focused on common topics and points of view and certainly beyond of any formal established and official relationship.

Regarding topology, there are communities focused on users (geographical, demographical and thematic ones) and communities focuses on organization (vertical, functional and also geographical ones) (Hagel and Armstrong, 1997). Although all kind of communities are interesting, because of constraints of the case study and looking for defining a clear and limited framework, the ones that we are really interested on are those focused on users and thematic, for practical reasons. This means that a virtual community can focus its activity a) on the development of any product or resource while using collaborative working, such as a piece of software or reports writing, b) on the discussion and sharing of experiences and backgrounds, such as a support on skills or behaviour, c) on the tracking of people, groups or specific initiatives, such as sportive, economical or musical, d) on the sharing of knowledge on very specific issues, such as educational or technical, and e) on the learning of any kind of subject (Pallof and Pratt, 1999; Powers, 1997).

More specifically, we will focus on these two last features: sharing of knowledge and learning of a subject. This means that one member could share knowledge about a specific topic getting some learning in parallel, or the community itself makes a structure and becomes a learning core organizing activities and providing facilities looking for this goal.

Besides, we should stress that any virtual community is not pure while working (Haughey and Anderson, 1998; Harvey, 1995). So, the marriage between collaborative working and learning or the one between sharing backgrounds and sharing experiences, are really usual. On the same way, inside a well-established community a few activity sub-groups could come up a) because of some fine tuning on the topic, b) because of the concentration in a specific channel of communication (sometimes even outside of the facilities and inside the virtual community, like the private email, for instance) or c) because of the raising of a very concrete initiative. Therefore, both the communication flows and the evolution of the contents and definition in the virtual community, could move forward, mutate and be enriched with other topics and parallel activities, fully or partially related to the original drive. These add-ons would be a natural effect of the logical progression in the original group and objectives.

Within this context, we see a non-structure learning (Wells, 2001) as the associative and spontaneous learning coming from a fluent relationship and without any scheduled behavioural pattern between the members of the virtual community. Furthermore, the participation of any user only depends on his/her criteria and understanding and not on any kind of imposition or need of adaptation to any work methodology or to any pre-defined behaviour chasing a didactical or methodological goal. This way, both the virtual communities (P2P, 2001) and the non-formal learning or non-structured learning (Hoffman, 2005) are based on the existing and growing semantic links between their users. In virtual communities, the nodes are the users and also the resources and posts of these ones to the network. In non-structured learning, the nodes are the interconnected information elements getting a knowledge network.

## **2. THE IMS LEARNING DESIGN SPECIFICATION**

The IMS Learning Design Specification, or just IMS LD from now on, was published in 2003 by the IMS Global Learning Consortium (IMS, 2003). This specification is able to represent and encode learning structures for both, single and multiple learners, grouped by roles, like “learner” or “staff” (Koper and Tattersall, 2005; Burgos et al, 2005). A lesson plan can be modelled in IMS LD, defining roles, learning activities, services and several other elements, making a Unit of Learning (UoL). Later, this modelled lesson plan (or UoL) is packaged with the nested resources in a compressed ZIP file and it is published and run in a player. The player will coordinate the teachers, the students, the activities as long as their respective learning processes. A user will take then a role to play with and will carry out the related activities in order to complete a satisfactory Unit of Learning. All together, the Unit of Learning structure, the roles taken and the activities taken build the learning scenario that must be run in an IMS LD compliant system.

IMS LD does not offer a particular pedagogic model or models, but can rather be used to define a practically unlimited range of scenarios and pedagogic models. Because of this it is often referred to as a pedagogic meta-model. Some previous e-learning initiatives have claimed to be pedagogically neutral. IMS LD does not aim for pedagogic neutrality, but seeks to enable pedagogically aware e-learning.

It was developed thinking of e-learning and virtual classrooms, although face-to-face lessons can also be carried out and integrated in a structure created with this specification, meaning learning activities or support activities, fully integrated in blended learning. As long as the final aim of IMS LD is to create full-rich Units of Learning with supporting content that looks for fulfilling learning objectives in order to get the best learning experience, face-to-face meetings or any other possible learning resources are permitted, such as videoconference, collaborative blackboards or any field-work.

### **3. VIRTUAL COMMUNITIES AND PROJECTS ON IMS LD**

In the light of the increasing concern on e-learning issues in the last fifteen years, and moreover on the standardization of the e-learning, several international groups come across a very interesting and hectic activity on research, production and/or dissemination. Specifications like SCORM (ADL, 2000), IMS content Packaging (IMS, 2001) or IMS Simple Sequencing (IMS, 2003a) become a good starting point to structure learning content or any other kind of content. Among them, IMS Learning Design raises as the next logical step forward on learning objects and initiatives, allowing not just the packaging of resources, but also the full modelling of learning scenarios and the application of several pedagogical models (Burgos et al, 2005a). Using IMS LD, teachers and learning designers are entitled to move their face-to-face lesson plans to online platforms, giving enough warranty on interoperability and re-use of the learning information packages created.

More than thirty international groups and projects around IMS Learning Design or directly related to it show a promising outlook for this young specification. From CopperCore (Vogten and Martens, 2004) as the main engine, to the viewer Reload (Bolton, 2004) or the Player Sled (OUUK, 2005), through half a dozen of editors, it is easy to say that IMS LD is technically supported and raise the interest of the academic sector (Open University of The Netherlands, Open University of the United Kingdom, Universities of Duisburg, Piraeus, Valladolid, Vigo, etcetera) but also of the commercial market (eLive, 8Lem, etcetera)

In addition, the amount of virtual communities growing up around this topic is high and continuously increasing. They are usually hosted by international projects funded by official institutions (UNFOLD, Ladie, Lornet, iClass...) but also by some spontaneous representation coming from active discussion forums like Moodle (Dougiamas, 2004). These actual groups of discussion talk about recurrent topics on e-learning, and improve a healthy critic about features, usefulness and functionalities of the specifications, their theoretical backgrounds and the related applications. These communities show the general interest for specifications in the groups of end-users while improving the online learning and to adapt the face-to-face teaching to virtual platforms (mainly teachers, content providers and learning designers, but also system developers and researchers). Their usual main goal is to make profitable the time and the effort needed to adapt contents and pedagogy into interoperable and re-usable units of learning. Following, the main non-structure learning virtual communities and projects around IMS LD, looking for getting the specification closer to the target group and for a wider and deeper dissemination are: R2R (<http://commons.ucalgary.ca/weblogs/learningdesign>, Canada), ACETS ([www.acets.ac.uk](http://www.acets.ac.uk), United Kingdom), SCOPE (<http://www.tecn.upf.es/scope/showcase/>, Europe), Pool (<http://www.edusplash.net>, Canada), Edusource (<http://www.edusource.ca>, Canada), Iclass ([www.iclass.info](http://www.iclass.info), Europe), Ladie ([www.elframework.org/refmodels/ladie](http://www.elframework.org/refmodels/ladie), United Kingdom), Lornet ([www.lornet.org](http://www.lornet.org), Canadá), DialogPlus ([www.dialogplus.org](http://www.dialogplus.org), United Kingdom and USA) and UNFOLD Project (UNFOLD, 2004).

## **4. THE UNFOLD PROJECT**

Among all the projects on IMS LD, the Framework 6 IST Coordination Action UNFOLD becomes the more prominent in terms of dissemination.

The key aspect for the development of e-learning is that it supports better learning, but progress depends on the adoption of open standards. So far these have limited e-learning to a relatively simple, single learner, 'deliver-and-test' approach, and are a step backwards if considered from a pedagogic perspective alone.

A major advance was marked by the recent IMS Learning Design specification which enables flexible and sophisticated pedagogical approaches to elearning, by providing support for multiple as well as single learners and their coordination, a wide range of present, as well as future, pedagogical models and learning activities and learning services, as well as content. This way, UNFOLD promotes better e learning by supporting the implementation and use of pedagogically strong open standards.

The core activity of UNFOLD is to support and facilitate Communities of Practice (CoPs), and so provide a space where people can collaborate to support open standards. As we explained before, Communities of Practice (CoPs) are groupings of people who come together around common interests and expertise, creating, sharing, and applying knowledge within and across the boundaries of tasks, teams and organisations. Currently the define a) System Developers, b) Teachers and Learning Providers and c) Learning Designers. Between all the facilities, one of the main goals of the UNFOLD Project is to organize face-to-face meetings to disseminate as much and good as possible the specification IMS LD.

## **5. THE VIRTUAL COMMUNITY LN4LD**

The third CoP of the UNFOLD Project, Learning Designers, has a separate website available at <http://moodle.learningnetworks.org>, and called Learning Network for Learning Design (or just LN4LD from now on), becoming the most prominent virtual community on IMS LD. This has been set up as part of the Learning Networks programme being carried out at the Educational Technology Expertise Centre of The Open University of The Netherlands (OUNL). The use of this additional infrastructure enables the project to leverage existing OUNL resources for the support of Learning Design, providing information, tutorials, worked examples of learning designs, and a growing repository of learning design units.

LN4LD is a pilot learning network for those interested in finding, applying and exchanging information about IMS LD. OUNL have created LN4LD to gain early feedback on functional, technical and organisational aspects of creating and maintaining a learning network and to help meet the demand for further information on IMS Learning Design. Moreover, LN4LD is used to investigate mechanisms which stimulate learners to move beyond mere consumption of learning material towards active participation in the creation of learning experiences and to study the relationships between virtual activity and face-to-face events.

There are two important concepts related to the description of LN4LD: a) a Learning Network (LN) is a distributed set of people who interact to create and share learning events while developing their competence in a particular discipline; and b) a learning event, which we refer to as an Activity Node (AN), can be anything that is available to support learning, such as a course, a workshop, a conference, a lesson, an internet learning resource, etcetera. All participants can create new ANs, can adapt existing ANs or can delete ANs, subject to the constraints of the policies which are operation for the learning network

In terms of user, registered and unregistered ones are distinguished, with registered users having access to the UNFOLD Learning Designers Community of Practice (CoP) and able to place new postings in the LN4LD forums and reply to existing.

Furthermore, registered users can cooperate on solving problems and answering questions concerning IMD Learning Design. Activity Nodes are dedicated to IMS LD topics (for example "IMS LD and meta data" or "IMS LD and SCORM"), and groups of interested parties investigate issues in the area and develop learning activities and materials.

## **6. PERIOD OF STUDY. LN4LD AND UNFOLD'S EVOLUTION AND DESCRIPTION OF THE MEASURING**

LN4LD started in February 2004 as an pilot experiment in the OUNL. Thereby it was seeded with five activity nodes looking for the attraction and stimulation of new users interested on IMS LD and trying to

establish a operational base for potential users. In July 2005 LN4LD made a joint venture with the UNFOLD Project chasing a mutual support while sharing some important goals in both. Since then, several online activities have been taken and a few more activity nodes have been added up to nineteen. LN4LD carried out a main experiment between October 2004 and January 2005 on stimulation and encouraging participation inside the learning network that came out with two published papers (Hummel *et al*, 2005, 2005<sup>a</sup>).

For the measuring approached in this paper the period of study goes from January and June 2005 and continues the research activity started before this year and concerning the behaviour of users in a non-structured learning virtual community. The main goal of the present project is to demonstrate that face-to-face meetings encourage participation in virtual communities.

The first experiment carried out in LN4LD showed a core group of 125 registered users with a moderate activity, as Hummel *et al* show (2005), and was finished in January 10th, 2005. Afterwards a tracking of LN4LD was made, recording logs and making database back-ups with actions taken and registered users, but never interfering again with any mechanism to improve or modify the behaviour inside the network.

As told before, since July 2004 LN4LD and UNFOLD are interlaced and support each other in the dissemination of IMS LD. The challenge was to measure the influence of the face-to-face meetings of UNFOLD in the virtual community LN4LD without making on purpose any addition to influence the spontaneous behaviour of the community users. For this, we focused our research on the observation and recording of LN4LD joint together with the organization of face-to-face meetings in UNFOLD, during the five months from January to June 2005. In this period, three presence meetings were carried out by UNFOLD in February (Valkenburg, The Netherlands), in April (Barcelona, Spain) and in June (Braga, Portugal) with an averaged attendance of 70 people. Also, some punctual participations in congresses organized by others took place in Paris, Sheffield and Madrid, although these last ones are no significant in the measuring. The promotion of all these events was made inside the related networks and portals of UNFOLD and LN4LD and, mainly, between the already registered users in both communities. In addition, back-ups and readings of specific information concerning the users activity were made monthly in LN4LD and some control measuring were carried out in March the 21st and in June the 27th, right after the first and the last face-to-face congresses in The Netherlands and Portugal.

These measuring monitored several variables: actions taken per activity node, users per date, users access, actions per user and scoring (following the rule defined in Hummel *et al*, 2005, about encouraging and participation using rewarding systems). Although these four variable were useful, the most effective one showing participation is the first one, actions taken per activity node. Within the nineteen activity nodes of LN4LD users can visit the links, make queries, answer questions, rate posts and add points to the scoring table (although the scoring system has no effect for the current period of study and it was only used before, between October 2004 and January 2005).

We also registered the amount of users during the period (January, March and June) to check the increase or decrease of members and potential contributors to the learning networks.

## 7. DATA ANALYSIS AND LOGS

In Table 1, the data analysis shows the increase of averaged participation since the last measuring made when the previous experiments on encouraging finished (January 2005). This increase is of 48% of participation between March and June 2005, without log-in records, and of 73%, with log-in records. The basic difference between both variables, without and with log-in records, is that many users jump into the network to check if any news are coming but they don't go further. Even they don't check forums or any other activity node although it was only to participate just lurking (Nonnecke and Preece, 2001). Because of this, the amount of actions including log-in records is not completely significant for our purposes and we don't include them in our report, although we recorded just in case. Making the comparison with the information backed-up in January the increase is of 594%. Specifically, participation went from 3.750 actions in January to 17.553 actions in March and to 26.028 actions in June, giving an increase of 8.475 actions from March and of 22.278 actions from January.

Table 1. Measuring between January and June 2005

Activity Nodes 270605	Actions	Actions	Actions	New actions	% of new	% of new
	100105	210305	270605		March-June	January-June
Advanced Issues with IMS Learning Design		263	395	142	56	
Change Proposals IMS LD Specification		674	812	138	20	
Experience a running Unit of Learning		1.319	1.531	212	16	
Getting started with the IMS LD Specification		3.033	4.294	1.261	42	
How to modify a Unit of Learning		1.342	1.709	361	27	
IMS Learning Design and Metadata		1.015	1.196	183	18	
Online Educa Madrid Mayo 2005 (en castellano)			477	477	100	
PROLEARN/UNFOLD Heerlen September 2005		73	271	198	271	
Runnable LD Example Units of Learning		3.269	6.252	2.983	91	
Understanding the basics of IMS Learning Design		2.041	2.795	754	37	
UNFOLD CoP Meeting in Barcelona April 2005		143	1.055	912	638	
UNFOLD CoP Meeting in Braga (Portugal) June 2005			286	286	100	
UNFOLD hands-on meeting in Valkenburg 2005		3.495	3.893	397	11	
UNFOLD Paris Workshop March 2005		27	80	53	196	
UNFOLD Presence at AII-Hab June 2005			54	54	100	
UNFOLD Presence at Campus Virtual June 2005 (en castellano)			38	38	100	
UNFOLD presence at the Online Educa Berlin 2004		289	313	24	8	
UNFOLD session at the EADTU 2004 conference		421	422	1	0	
UNFOLD Workshop at EUCEN Conference 2004		168	159	1	1	
	3.750	17.553	26.028	8.475	48	594
Without logins	13803					
		8475				
		22278				
	3.750	20.063	30.235	14.653	73	705
With logins	16313					
		10172				
		26485				

The Activity Node with a higher increase was “UNFOLD CoP Meeting in Barcelona April 2005” with 638% (143 in March and 1.055 in June) while the most used Activity Node was “Runnable LD Example Units of Learning” with a final sum of 6.252 actions and an increase of 2.983 from March.

In addition, the Figure 1 shows the distribution of actions per activity node and the graphical reading of the previous analysis in March and June. Marked with asterisks are the largest total increase (Runnable...) and the biggest percentage increase (Barcelona...)

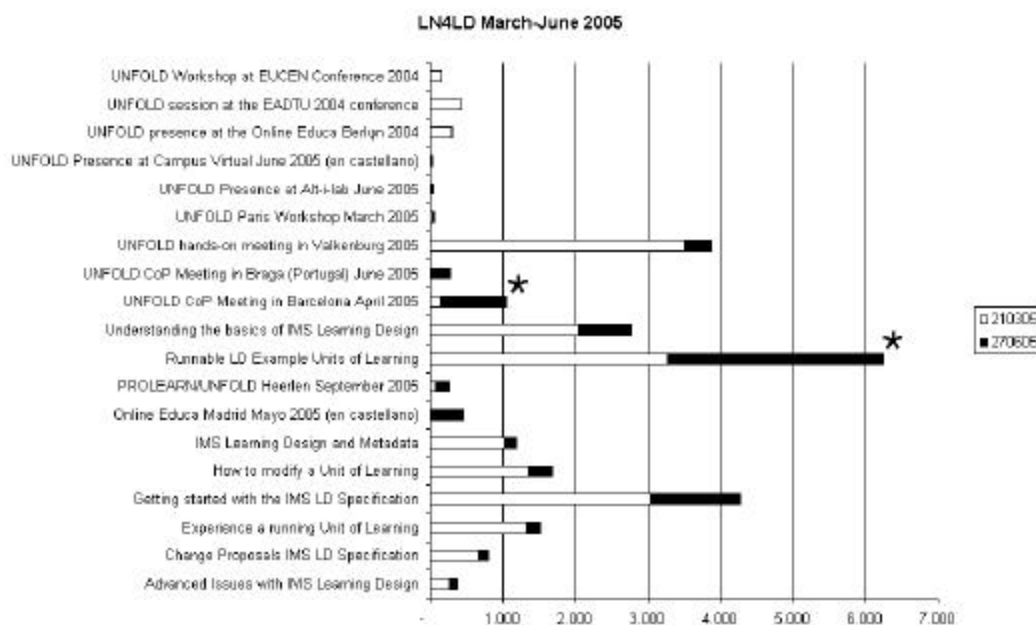


Figure 1. Actions taken per Activity Node in March and June 2005

Concerning the amount of registered users, Figure 2 shows a progress from 125 members in January to 304 in March and 495 in June. This means an increase of 243% in March and a cumulative one of 396% in June. All these figures just show a continuous increase of percentages and raw numbers in both, actions taken and registered users.

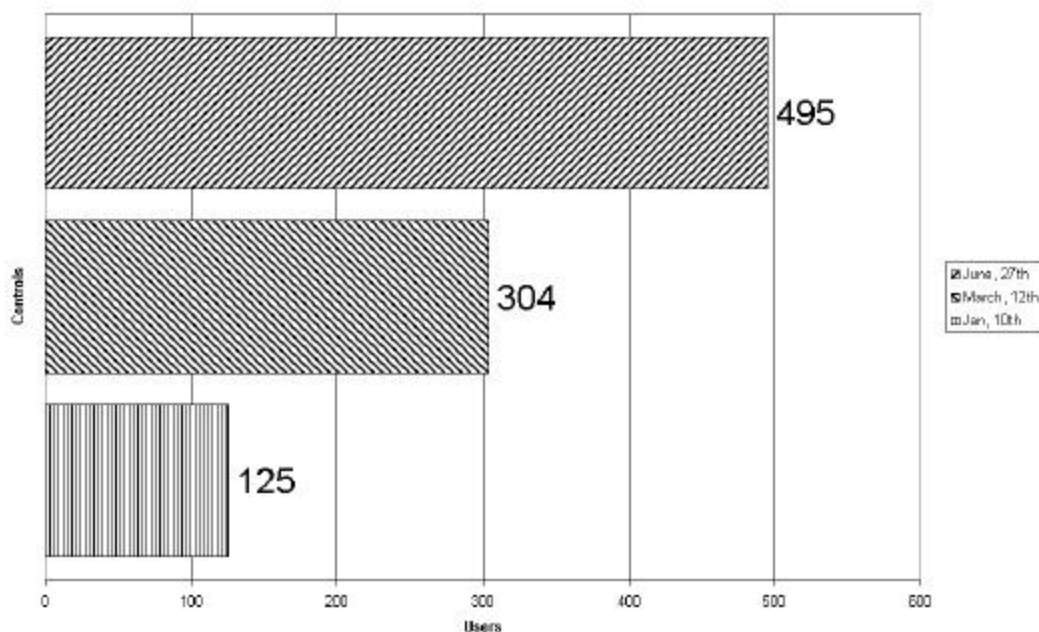


Figure 2. Registered users in January, March and June 2005

All these data report underlines out hypothesis of a direct cause and effect relationship between the face-to-face meetings carried out by UNFOLD and the increase of user activity in the virtual community of LN4LD

## 8. CONCLUSION

The virtual community Learning Network for Learning Design (LN4LD) is an online-exclusive community that provides activity nodes about the specification IMS Learning Design. It was born in February 2004 and launched in June of the same year. Its activity became stronger through the joint venture with the European Project UNFOLD that organizes face-to-face meetings and online chats, also about IMS Learning Design. During January and June 2005 several measuring were made about online participation and user behaviour in LN4LD and the effect of face-to-face meetings, taking the advantage of three international presence meetings, funded by UNFOLD and promoted inside both communities. This process follows the experiment carried out by the authors before January 2005 about encouraging participation inside the same virtual community (Hummel *et al*, 2005a).

Taking into account two variables, a) user participation, and b) registration of new users, the recorded logs show a clear and exponential progression in both. LN4LD comes from 3.750 actions taken by 125 users in January 2005. After the meetings between March and June 2005, the amount of actions taken increased to 594% and the amount of registered users to 396%. This total figures clearly show the direct relationship between face-to-face meetings and activity inside the virtual community and demonstrate how presence meetings encourage the registration of users and, moreover, the amount of active users. The progress can be also checked between the two control measuring in the period (March and June) with an averaged increase of 48% in actions taken with a maximum of 638% in one specific Activity Node.

In order to suggest the reasons of this clear increase and taking from all the features that we used in the beginning to describe a virtual community (a common objective or interest together with other people, the willing to share a personal experience or background or to establish social relationships, the willing of enjoying some rewarding new experiences or of living a fantasy, the need of making any kind of transaction.), we suggest that the willing of sharing a experience or establishing social relationships (Hagel and Armstrong, 1997) is the drive most related to the participation in presence meetings as long as face-to-face activity encourages the strength and the frequency of the virtual links. Furthermore, a better and more direct knowledge of the online users via the meetings and the higher chance for synchronous

discussions with multi-lateral debates about the same and related topics used in the learning network encourages its use and the interactivity with the rest of members.

## REFERENCES

- ADL, 2000. *Sharable Content Object Reference Model, SCORM*. Available at <http://www.adlnet.org/index.cfm?fuseaction=scormabt>. Retrieved on August 31<sup>st</sup>, 2005.
- Berners-Lee, T., 2001. *Weaving the Web*. Texere Publishing Ltd, Thomson, London, United Kingdom.
- Bolton, 2004. *Reload Project*. United Kingdom: The University of Bolton, The University of Strathclyde and JISC. Available at <http://www.reload.ac.uk/editor.html>. Retrieved August 31st, 2005.
- Burgos, D., Berbegal, N., Griffiths, D., 2005. *IMS Learning Design Level 0*. Available at <http://moodle.learningnetworks.org/mod/resource/view.php?id=174>. Retrieved on August 7<sup>th</sup>, 2005.
- Burgos, D., Berbegal, N., Griffiths, D., Tattersall, C. and Koper, R., 2005a. IMS Learning Design: How the specifications can change the current e-learning landscape. In *E-learning World*, issue 2, March-April. 2005. Magazine of Moscow State University for Economy, Statistics and Computer Science, Moscow, Russia.
- Dougiamas, M., 2004. *Moodle*. Available at <http://moodle.org/>. Retrieved on August 31st, 2005.
- Figallo, Cliff, 1998. *Hosting Web Communities*. John Wiley & Sons, New York, USA.
- Hagel III, J. and Armstrong, A., 1997. *Net.gain: expanding markets through virtual communities*. Harvard Business School Press, Boston, USA.
- Harvey, P., 1995. *Cyberespace et communautique*. Presses de l'Université Laval, Québec, Canada.
- Haughey, N. y Anderson, T., 1998. *Networked learning: the pedagogy of the INTERNET*. Chenelière/McGraw Hill, Toronto, Canadá.
- Hoffman, B., 2005. *Informal Learning*. ASTD Press, Alexandria, USA.
- Hummel, H., Tattersall, C., Burgos, D., Brouns, F., Kurvers, H., Koper, R., 2005. Critical Facilities for Active Participation in Learning Networks. In *International Journal of Web-based Communities*, vol. 2, 2005., issue 1.
- Hummel, H., Burgos, D., Tattersall, C., Brouns, F., Kurvers, H., Koper, R., 2005a. Encouraging contributions in learning networks using incentive mechanisms. In *Journal of Computer Assisted Learning*, 21, 355-365.
- IMS, 2003. *Learning Design*. Boston: USA. Available at [www.imsglobal.org](http://www.imsglobal.org) Retrieved on July 30th, 2005.
- IMS, 2003a. *Simple Sequencing*. Boston: USA. Available at [www.imsglobal.org](http://www.imsglobal.org) Retrieved on July 30th, 2005.
- Koper, R., Tattersall, C., 2005. *Learning Design: A Handbook on Modelling and Delivering Networked Education and Training*. Springer Verlag, Germany.
- Kwoch, E. y Schwier, R., 1997. *Characteristics of technology-based virtual learning communities.*, <http://www.usask.ca/education/courswrk/802papers/communities/communities.htm>.
- Nonnecke, B., & Preece, J., 2001. *Why lurkers lurk?* Paper presented at Americas Seventh Conference on Information Systems, AIS, 2001. Boston, MA, USA.
- OUNL, 2004. *Learning Network for Learning Design*. Heerlen: Open University of The Netherlands, OTEC. Available at <http://moodle.learningnetworks.org>. Retrieved on October 9th, 2005.
- OUUK, 2005. *Sled player*. Open University of United Kingdom, available at <http://sled.open.ac.uk>.
- Palloff, R y Pratt, K, 1999. *Building learning communities in cyberspace*. Jossey-Bass, San Francisco, USA.
- Powers, M., 1997. *How to program a virtual community*. Ziff-Davis Press, New York, USA.
- PSP, 2001. *Cómo Crear y Administrar una Comunidad Virtual?*. Professional Services Provider, Miami, USA.
- Rheingold, H., 1993. *The virtual community*. Addison-Wesley, Reading, USA.
- Scott, J., 1994. *Social networks analysis: a handbook*. Sage Publications, London, United Kingdom.
- Spratt, T., 2003. *History of Royal Society*. Kessinger Publishing, United Kingdom.
- UNFOLD, 2004. *UNFOLD Project*. Available at [www.unfold-project.net](http://www.unfold-project.net). Retrieved August 30<sup>th</sup>, 2005.
- Vogten, H., Martens, H., 2005. *CopperCore 2.2.4*. Open University of The Netherlands, Heerlen, The Netherlands. Retrieved at [www.coppercore.org](http://www.coppercore.org) . Retrieved on October 9th, 2005.
- Wells, G., 2001. *Indagación dialógica. Hacia una teoría y una práctica socioculturales de la educación*. Paidós, Barcelona, España.